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Revised 01/29/2002

OIPE

RAW SEQUENCE LISTING   DATE: 03/04/2002
PATENT APPLICATION: US/10/076,839   TIME: 14:56:13

Input Set : A:\PH-1176 (Sequence Listing).txt
Output Set: N:\CRF3\03042002\J076839.raw


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    3 <110> APPLICANT: Japan International Research Center for Agricultural Sciences
    5 <120> TITLE OF INVENTION: Full-length Genomic RNA of Papaya Leaf-Distortion Mosaic
Virus
    7 <130> FILE REFERENCE: PH-1176
C--> 9 <140> CURRENT APPLICATION NUMBER: US/10/076,839
C--> 9 <141> CURRENT FILING DATE: 2002-02-15
    9 <150> PRIOR APPLICATION NUMBER: JP 2001-040523
   10 <151> PRIOR FILING DATE: 2001-02-16
   12 <160> NUMBER OF SEQ ID NOS: 4
   14 <170> SOFTWARE: PatentIn Ver. 2.0
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**Does Not Comply
Corrected Diskette Needed**

ERRORED SEQUENCES

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  869 <210> SEQ ID NO: 2
  870 <211> LENGTH: 3269
  871 <212> TYPE: PRT
  872 <213> ORGANISM: Papaya Leaf-Distortion Mosaic Virus
  874 <400> SEQUENCE: 2
  875 Met Ser Ile Val Ile Gly Asp Phe Ser Ile Pro Leu Ile Cys Arg Thr
  876   1               5              10                  15
  878 Glu Gln Ile Glu Cys Val Arg Leu Val Pro Gly Thr Arg Val Glu Glu
  879              20                  25                  30
  881 Val Lys Thr Ile Lys Lys Val Leu Lys Thr His Tyr Gln Glu Ile Thr
  882           35                  40                  45
  884 Leu Gly Cys Thr Asp Arg Cys Ala Gly Leu Ser Ala Tyr Thr Lys Thr
  885        50                  55                  60
  887 Ser Leu Lys Arg Ala Ile Lys Glu Lys Asp Leu Thr Ala Ser Gly Ser
  888 65                  70                  75                  80
  890 Cys Phe His Cys Gly Leu Arg Ala Gln Ile Gly Glu Gly Arg Lys Arg
  891                  85                  90                  95
  893 Val Glu Leu Ala Pro Ile Ser Val Met Glu Asp Val Glu Thr Val Glu
  894              100                 105                 110
  896 Gln Val Leu Val Pro Cys Met Val Glu Glu Lys Tyr Tyr Lys Glu Val
  897          115                 120                 125
  899 Ser Asn Phe Gln Lys Ala Thr Leu Ile Asp Lys Pro Lys Leu Thr Ile
  900       130                 135                 140
  902 Ala Pro Val Leu Met Ala Gln Pro Ala Gln Val Pro Arg Pro Ala Val
  903 145                 150                 155                 160
  905 Phe Asn Glu Ile Arg Lys Val His Glu Glu Met Lys Ser Gln Thr Ser
  906                 165                 170                 175
  908 Glu Asn Lys Val Leu Glu Glu Glu Thr Gln Cys Ala Ser Asp Ala Ala
  909                 180                 185                 190
  911 Leu His His Leu Asp Asp Val His Ala Cys Arg Ala Arg Ala Gln Val
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912           195                   200                   205
914 Gly Ile Glu Arg Ile Leu Ala Arg His Ala Arg His Arg Ile Glu Ala
915      210                   215                   220
917 Arg Gln Gln Val Glu Glu Glu Gln Ser Glu Ala Leu Ala Ala Phe Glu
918 225                   230                   235                   240
920 Ser Phe Phe Asn Gln Thr His Arg Glu Asp Arg Tyr Glu Gly Lys Val
921                   245                   250                   255
923 Leu Thr Ile Arg Asn Gly Ile Thr Gly Trp Phe Glu Pro Asn Arg Asn
924                   260                   265                   270
926 Asp Ile Lys Asn Ala Ala Arg Arg Arg Lys Arg Ala Asn Lys Lys Ile
927      275                   280                   285
929 Pro Phe Val Ala Arg Glu Asn Asp Val Ala Arg Ile Glu Thr His Glu
930      290                   295                   300
932 Pro Asn Val Lys Glu Glu Thr Lys Asp Val Glu Glu Ala Thr Asp Thr
933 305                   310                   315                   320
935 Tyr Thr Phe Lys Lys Gln Arg Asn Asp Lys Lys Arg Val Leu Lys Glu
936                   325                   330                   335
938 Asn Val Ser Leu Ser Met Ala Arg Ile Asn Glu Leu Val Arg Cys Val
939      340                   345                   350
941 Thr Lys Leu Cys Arg Lys Asp Ser Lys Glu Leu Glu Phe Ile Gly Lys
942      355                   360                   365
944 Arg Gly Ser Leu Arg Val Gln Cys Thr Lys Asn Cys Gly Ser Arg Val
945      370                   375                   380
947 Ile Leu Arg His Leu Arg Gly Glu Leu Arg Arg Lys Asp Cys Tyr Trp
948 385                   390                   395                   400
950 Asp Arg Ile Ile Glu Asn Phe Phe Glu Ile Ala Ala Ala Lys Leu Gln
951                   405                   410                   415
953 Asn Lys Asn Leu Asn Asn Asn Glu Ser Val Arg Arg Gly His Ser Gly
954      420                   425                   430
956 His Ile Ile Gln Tyr Asp Lys Phe Arg Gly Leu Ser Gly Arg His Phe
957      435                   440                   445
959 Gly Ser Tyr Ile Ile Val Arg Gly Ser Met Asp Gly Arg Ile Ile Asp
960      450                   455                   460
962 Ala Arg Ser Lys Ile Thr His Ser Val Met Ile Asn Met Thr His Tyr
963 465                   470                   475                   480
965 Ser Asp Ala Gly Leu Ser Phe Trp Lys Gly Phe Asp Arg Gln Phe Ile
966                   485                   490                   495
968 Asp Ile Arg Asp Arg Pro Lys Asn Ala His Glu Cys Lys Ala Thr Ile
969      500                   505                   510
971 Asn Val Glu Glu Cys Gly Glu Met Ala Ala Ile Val Asn Gln Leu Leu
972      515                   520                   525
974 Phe Pro Met Trp Lys Ile Thr Cys Thr Gln Cys Gly Glu Leu Leu Glu
975      530                   535                   540
977 Met Leu Ser Gln Glu Glu Glu Leu Glu Ser Phe Arg Arg Lys Arg Ser
978 545                   550                   555                   560
980 Gln Leu Ala Ser Lys Leu Ser Ser Leu His Ile Lys Phe Pro Tyr Val
981                   565                   570                   575
983 Asp His Phe Leu Asn Arg Tyr Glu Asn Ser Leu Asn Arg Met Asn Thr
984      580                   585                   590
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986  Asn Phe Asp Ala His Lys Gln Ile Ala Gln Ile Ile Gly Ser Arg Lys
987          595                 600                 605
989  Glu Ile Pro Phe Ser Asn Leu Glu His Leu Asn Glu Leu Leu Ile Lys
990          610                 615                 620
992  Ser Asp Lys Leu Val Ser Glu Asp Phe Tyr Glu Met Ser Gln Cys Leu
993  625                 630                 635                 640
995  Leu Glu Leu Thr Arg Trp His Lys Asn Arg Ser Asp Ser Phe Lys Lys
996                  645                 650                 655
998  Gly Glu Ile His His Phe Arg Asn Lys Met Ser Gly Lys Ala Gln Phe
999                  660                 665                 670
1001 Asn Phe Ala Leu Met Cys Asp Asn Gln Leu Asp Lys Asn Gly Asn Phe
1002          675                 680                 685
1004 Val Trp Gly Glu Arg Gly Tyr His Ala Lys Arg Phe Phe Leu Asn Phe
1005          690                 695                 700
1007 Phe Glu Lys Val Asp Ser Thr Asp Gly Tyr Lys Lys His Ile Met Arg
1008 705                 710                 715                 720
1010 Val Asn Pro Asn Gly Thr Arg Gln Thr Ala Ile Gly Lys Leu Ile Leu
1011                  725                 730                 735
1013 Ser Thr Asp Pro Ser Thr Leu Arg Gln Gln Met Lys Gly Ser Pro Ile
1014                  740                 745                 750
1016 Thr Arg Val Pro Val Gly Lys Tyr Cys Thr Ser Lys Arg Asp Gly Cys
1017          755                 760                 765
1019 Tyr Val Tyr Pro Ala Cys Cys Val Thr Met Glu Asp Gly Thr Pro Leu
1020          770                 775                 780
1022 Phe Ser Asp Ile Lys Met Pro Thr Lys Asn His Leu Val Ile Gly Asn
1023 785                 790                 795                 800
1025 Ser Gly Asp Pro Lys Tyr Val Asp Val Pro Ser Ser Ser Ser Asp Met
1026                  805                 810                 815
1028 Ile Val Ala Lys Glu Gly Tyr Cys Tyr Leu Asn Ile Phe Leu Ala Met
1029          820                 825                 830
1031 Leu Leu Asn Val Asn Glu Ser Glu Ser Lys Ser Phe Thr Lys Lys Val
1032          835                 840                 845
1034 Arg Asp Ile Ile Val Pro Arg Leu Gly Gln Trp Pro Ser Leu Ile Asp
1035          850                 855                 860
1037 Val Ala Thr Glu Cys Tyr Phe Leu Ser Ala Phe His Pro Glu Thr Lys
1038 865                 870                 875                 880
1040 Asn Ala Glu Leu Pro Arg Ile Leu Val Asp His Thr Ser Lys Cys Met
1041                  885                 890                 895
1043 His Val Ile Asp Ser Tyr Gly Ser Leu Asp Thr Gln Phe His Val Leu
1044          900                 905                 910
1046 Lys Ala Asn Thr Val Ser Gln Leu Ile Lys Phe Ala Asp Asn Asp Leu
1047          915                 920                 925
1049 Asp Ser Glu Leu Lys His Tyr Leu Val Gly Gly Asp Leu His Ser Lys
1050          930                 935                 940
1052 Gln Ala Pro Gln Cys Ser Ile Lys Leu Leu Cys Lys Cys Ile Tyr Arg
1053 945                 950                 955                 960
1055 Pro Lys Leu Met Arg Gln Cys Ile Glu Glu Glu Pro Phe Leu Leu Ile
1056                  965                 970                 975
1058 Leu Ala Cys Ile Ser Pro Gly Val Leu Leu Ala Leu Tyr Asn Ser Gln
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          Input Set : A:\PH-1176 (Sequence Listing).txt
          Output Set: N:\CRF3\03042002\J076839.raw

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1059           980              985              990
1061 His Leu Glu Leu Ala Leu Lys Tyr Trp Met Ser Lys Gln Gln Ser Val
1062           995             1000             1005
1064 Ala Ala Leu Phe Ala Met Ile His Gly Leu Ala Ala Lys Val Thr Val
1065        1010             1015             1020
1067 Ala Gln Thr Leu Asn Glu Gln Arg Leu Ile Leu Glu Arg Gly Ala Arg
E--> 1068 025            1030             1035             1040
1070 Asn Leu Ile Ser Val Met Glu Thr Ile His Met Thr Ser His Ser Tyr
1071           1045             1050             1055
1073 Gln Pro Ala Leu Leu Gln Leu Gln Val Met Ala Asn Arg Arg Asp Met
1074           1060             1065             1070
1076 Asn Ser Thr Leu Asp Leu Ala Gly Phe Ser Ile Leu Gln Ser Glu Asp
1077        1075             1080             1085
1079 Ser Met Tyr Trp Met Glu Lys Ser Tyr Leu Met Glu Leu Glu Asp Ser
1080        1090             1095             1100
1082 Trp Asn Asp Leu Lys Trp Leu Glu Lys Leu Gln Glu Met Trp Arg Leu
E--> 1083 105            1110             1115             1120
1085 Ser Lys Tyr Ser Ile Ser Gly Ile Ser Gln Leu Ser Met Lys Gly Ala
1086           1125             1130             1135
1088 Thr Asp Leu Gly Gly Arg Tyr Ser Val Ser Ala Lys Gln Phe Ile Thr
1089           1140             1145             1150
1091 Ser Val Met Lys Pro Val Lys Lys Ser Cys Val Lys Ala Arg Asp Thr
1092        1155             1160             1165
1094 Cys Lys Glu Val Ile Ile Asn Thr Thr Ser Trp Thr Phe Arg Ala Thr
1095        1170             1175             1180
1097 Phe Ser Leu Cys Arg Trp Cys Leu Pro Asp Cys Leu Lys Phe Ile Asn
E--> 1098 185            1190             1195             1200
1100 Met Leu Ile Val Ile Ser Leu Ile Leu Ser Ile Trp His Ser Ala Asn
1101           1205             1210             1215
1103 Ser Ile Ser Phe Asp Tyr Ala Gln Met Lys Arg Glu Lys Gln Val Asn
1104           1220             1225             1230
1106 Ile Glu Lys Val Leu Met Asn Asn Leu Val Ala Leu His Lys Glu Gln
1107        1235             1240             1245
1109 Ile Lys Ile Asn Pro Asp Leu Thr Lys Glu Glu Phe Lys Glu Tyr Ile
1110        1250             1255             1260
1112 Ala Arg Ser Arg Pro Glu Leu Ile Ala Leu Val Asn Lys Glu Leu Gln
E--> 1113 265            1270             1275             1280
1115 Glu Glu Val Asp His Gln Ala Lys Arg Lys Gly Glu Gln Asn Leu Glu
1116           1285             1290             1295
1118 Lys Ile Ile Ala Phe Val Ala Leu Val Met Met Ile Phe Asp Ser Glu
1119        1300             1305             1310
1121 Lys Ser Asp Cys Val Tyr Lys Thr Leu Asn Lys Leu Arg Asn Leu Val
1122        1315             1320             1325
1124 Ala Thr Cys Asp Glu Pro Val Ala His Gln Ser Leu Asp Asp Ile Gln
1125        1330             1335             1340
1127 Asp Ile Leu Thr Asp Lys Glu Thr Thr Ile Asp Phe Asp Leu Asp Cys
E--> 1128 345            1350             1355             1360
1130 Glu Gly Ser Lys Val Thr Glu Phe Lys Glu Met Asn Phe Ala Ala Trp
1131           1365             1370             1375
```

(handwritten note in right margin)
When an amino acid Number 1000 or greater, up to 9,999, lands on the left-hand margin. The first Number in the series must be placed under the first letter of the amino acid. Example:
Ala
1025

```
1133 Trp Glu Lys Gln Leu Gln Cys Asp Arg Val Val Pro His Tyr Arg Thr
1134          1380                1385                1390
1136 Thr Gly Lys Phe Ile Glu Phe Thr Arg Glu Ser Cys Val Ser Val Ser
1137.         1395                1400                1405
1139 Asn Thr Ile Ser His Ala Pro Glu Lys Glu Trp Ile Val Arg Gly Gly
1140      1410                1415                1420
1142 Val Gly Ser Gly Lys Ser Thr Gly Leu Pro Phe Ala Leu Ser Ser Lys
E--> 1143 425              1430                1435                1440
1145 Gly Ala Val Leu Met Leu Glu Pro Thr Arg Pro Leu Ala Glu Asn Val
1146              1445                1450                1455
1148 Ser Arg Gln Leu Arg Gln His Pro Phe Tyr Ala Asn Pro Thr Leu Arg
1149              1460                1465                1470
1151 Met Arg Gly Met Ser Ser Phe Gly Ser Ser Asn Ile Cys Ile Met Thr
1152         1475                1480                1485
1154 Ser Gly Phe Ala Phe Asn Tyr Phe Ala Asn Asn Pro Leu Lys Leu Ser
1155      1490                1495                1500
1157 Asp Phe Glu Phe Val Ile Ile Asp Glu Cys His Val Leu Asp Ser Asn
E--> 1158 505              1510                1515                1520
1160 Ala Met Ala Phe Val Cys Leu Leu Lys Glu His Asn Tyr Asp Gly Lys
1161              1525                1530                1535
1163 Leu Leu Lys Val Ser Ala Thr Pro Gln Gly Arg Glu Cys Glu Phe His
1164              1540                1545                1550
1166 Thr Gln His Pro Val Ser Ile His Ile Glu Glu Gln Leu Ser Phe Gln
1167         1555                1560                1565
1169 Ala Phe Cys Glu Ala Gln Gly Thr Gly Ser Ala Arg Asp Val Ile Asn
1170      1570                1575                1580
1172 Lys Gly Asp Asn Ile Leu Val Tyr Val Ala Ser Tyr Asn Glu Val Asp
E--> 1173 585              1590                1595                1600
1175 Gln Leu Ser Lys Met Leu Gly Asp Lys Gly Tyr Leu Val Thr Lys Val
1176              1605                1610                1615
1178 Asp Gly Arg Thr Met Lys Ile Gly Ser Thr Asp Ile Val Thr Lys Gly
1179          1620                1625                1630
1181 Ser Ser Gln Lys Lys His Phe Ile Val Ala Thr Asn Ile Ile Glu Asn
1182         1635                1640                1645
1184 Gly Val Thr Leu Asp Val Asp Val Val Val Asp Phe Gly Leu Lys Val
1185      1650                1655                1660
1187 Thr Ala Glu Ile Asp Tyr Asp Asn Arg Cys Val Asn Tyr Thr Lys Thr
E--> 1188 665              1670                1675                1680
1190 Ser Ile Ser Tyr Gly Glu Arg Ile Gln Arg Leu Gly Arg Val Gly Arg
1191              1685                1690                1695
1193 His Lys Lys Gly His Ala Met Arg Ile Gly Thr Thr Ile Lys Gly Leu
1194          1700                1705                1710
1196 Ile Glu Ile Pro Ser Leu Val Ala Thr Gln Ala Ala Phe Gln Cys Phe
1197         1715                1720                1725
1199 Thr Tyr Gly Leu Pro Val Met Thr Gln Gly Val Ser Val Asn Ser Leu
1200      1730                1735                1740
1202 Ser Asn Cys Thr Val Arg Gln Ala Arg Val Met Ser Arg Phe Glu Leu
E--> 1203 745              1750                1755                1760
1205 Pro Pro Tyr Phe Met Ala Ser Leu Val Tyr His Asp Gly Ser Met His
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1206              1765           1770           1775
1208 Pro Glu Ile His Lys His Leu Ile Pro Tyr Lys Leu Asp Glu Ser Glu
1209         1780           1785           1790
1211 Ile Gln Leu Ser Ala Met Ala Phe Asn Phe Thr Val Thr Ser Ile Trp
1212     1795           1800           1805
1214 Leu Asp Cys Lys Phe Tyr Asp Ser Ile Gly Ile His Leu Asp Leu Pro
1215   1810           1815           1820
1217 Arg Glu Ala Lys Ile Pro Phe His Cys Arg Glu Phe Pro Asp Met Lys
1218 825         1830           1835           1840
1220 Tyr Arg His Leu Trp Glu Asp Ile Leu Lys Ile Lys Ser Ile Asn Cys
1221         1845           1850           1855
1223 Phe Gly Arg Met Ser Val Val Ser Ala Thr Lys Val Ala Tyr Thr Leu
1224         1860           1865           1870
1226 Lys Thr Asp Ile His Ser Ile Gly Lys Thr Leu Gly Tyr Ile Asp Ala
1227     1875           1880           1885
1229 Leu Leu Gln Glu Glu Tyr Arg Lys Gln His His Phe Lys Ala Met Thr
1230   1890           1895           1900
1232 Ser Asn Ala Cys Ser Gly Asn Thr Phe Ser Met Leu Ser Ile Ala Asn
1233 905         1910           1915           1920
1235 Ala Ile Arg Asn His Tyr Ala Lys Asp Tyr Thr Ala Gly Asn Ile Gln
1236         1925           1930           1935
1238 Lys Leu Gln Ala Ala Lys Asn Gln Ile Leu Glu Phe Val Asn Leu Asn
1239     1940           1945           1950
1241 Leu Asp Pro Ser Ala Lys Cys Gly Phe Gln Glu Phe Gly Ala Leu Glu
1242     1955           1960           1965
1244 Leu Val Thr His Gln Ser Arg Gln Glu Ile Ser Lys Phe Leu Asn Leu
1245   1970           1975           1980
1247 Arg Gly Lys Trp Asn Lys Ser Leu Ile Thr Arg Asp Ile Leu Val Leu
1248 985         1990           1995           2000
1250 Leu Gly Val Thr Ile Gly Gly Phe Trp Met Ile Trp Asp Lys Phe Lys
1251         2005           2010           2015
1253 Ser Asn Ile Glu Glu Val His His Glu Gly Lys Arg Lys Thr Gln Lys
1254         2020           2025           2030
1256 Leu Lys Phe Arg Asp Ala Arg Asp Lys Lys Met Gly Arg Glu Val Tyr
1257     2035           2040           2045
1259 Gly Asp Asp Gly Thr Ile Glu His Tyr Phe Gly Ser Ala Tyr Val Lys
1260   2050           2055           2060
1262 Arg Gly Ala Val Lys Gly Gln Lys Arg Gly Met Gly Glu Lys Ser Arg
1263 065         2070           2075           2080
1265 Arg Phe Val Ser Met Tyr Gly Val Asn Leu Glu Asp Phe Ala Phe Ile
1266         2085           2090           2095
1268 Arg Tyr Ile Asp Pro Ile Thr Gly Ala Thr Arg Asp Glu Ser Pro Leu
1269     2100           2105           2110
1271 Thr Asp Val Glu Leu Val Gln Ala His Phe Gly Glu Ile Arg Asp Lys
1272     2115           2120           2125
1274 Met Leu Asp Glu Gly Leu Ile Asp Arg Gln His Ile Leu Asn Lys Pro
1275   2130           2135           2140
1277 Gly Leu Thr Ala Tyr Leu Val Lys Asp Gly Val Lys Ser Ile Met Lys
1278 145         2150           2155           2160
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E--> 1218 825
E--> 1233 905
E--> 1248 985
E--> 1263 065
E--> 1278 145

```
1280 Val Asp Leu Gln Pro His Asn Pro Leu Leu Ile Cys Lys Asn Lys Ala
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1283 Thr Ile Ala Gly Phe Pro Glu Lys Glu Phe Val Leu Arg Gln Thr Asp
1284               2180                2185                2190
1286 Lys Ala Tyr Glu Val Ser Arg Glu Glu Leu Pro Glu Arg Asn Glu Asp
1287          2195                2200                2205
1289 Val Ser Phe Glu Gly Ala Ser Ser Val Lys Gly Leu Arg Asp Tyr Asn
1290        2210                2215                2220
1292 Gly Val Ala Ser Ala Ile Cys Gln Leu Thr Asn Asn Ser Asn Gly Arg
1293 225            2230                2235                2240
1295 Ser Thr Thr Thr Tyr Gly Val Gly Phe Gly Ser Tyr Ile Ile Val Asn
1296               2245                2250                2255
1298 Arg His Leu Phe Lys Glu Asn Asn Gly Asn Leu Leu Ile Lys Ser Thr
1299          2260                2265                2270
1301 His Gly Asn Phe Asn Ile Arg Asn Ser Lys Gln Ile Lys Val Val Gly
1302          2275                2280                2285
1304 Val Glu Asp Arg Asp Ile Ala Ile Leu Gln Met Pro Lys Asp Phe Pro
1305        2290                2295                2300
1307 Pro Phe Ala Gln Arg Leu Arg Phe Arg Asn Pro Ile Val Gly Glu Ser
1308 305            2310                2315                2320
1310 Ile Cys Leu Val Gly Asn Thr Phe Gln Glu Lys Tyr Asn Ala Ser Ile
1311               2325                2330                2335
1313 Val Ser Glu Thr Ser Lys Thr Phe Pro Arg Val Glu Gly Ser Phe Trp
1314          2340                2345                2350
1316 Lys His Trp Ile Asn Thr Thr Glu Gly His Cys Gly Leu Pro Leu Val
1317          2355                2360                2365
1319 Ser Val Thr Asp Gly Phe Ile Val Gly Ile His Ser Leu Met Ser His
1320        2370                2375                2380
1322 Lys Tyr Asp His Asn Tyr Phe Ser Asn Phe Asp Asp Ala Phe Glu Gly
1323 385            2390                2395                2400
1325 Asp Tyr Ile Asn Lys Leu Lys Glu Leu Lys Trp Glu Gln Asn Trp Thr
1326               2405                2410                2415
1328 Tyr Asn Val Asn Thr Val Ser Trp Gly Asn Met Lys Leu Gln Asp Ser
1329          2420                2425                2430
1331 Ala Pro Cys Lys Glu Phe Lys Thr Thr Lys Leu Ile Ser Asp Leu Cys
1332          2435                2440                2445
1334 Thr Glu Pro Val Cys Ala Gln Ser Ser Asn Gln Val Arg Trp Leu Tyr
1335        2450                2455                2460
1337 Asn Gln Leu Glu Gly Asn Leu Lys Ala Val Ala Thr Ile Pro Asn Asn
1338 465            2470                2475                2480
1340 Phe Val Thr Lys His Ile Val Lys Gly Arg Cys Lys Leu Phe Glu Leu
1341               2485                2490                2495
1343 Tyr Leu Gln Thr Arg Ser Glu Ala Asn Glu Phe Phe Lys Pro Leu Met
1344          2500                2505                2510
1346 Gly Phe Tyr Gly Lys Ser Gly Leu Asn Lys Glu Ala Tyr Ile Lys Asp
1347          2515                2520                2525
1349 Leu Phe Lys Tyr Ser Ser Glu Ile Pro Ile Gly Glu Val Asp Thr Glu
1350     2530                2535                2540
1352 Arg Phe Glu Asp Ala Val Gly Gln Val Ile Glu Ile Met Met Gln Trp
```

E--> 1293
E--> 1308
E--> 1323
E--> 1338

```
E--> 1353 (545)              2550            2555               2560
     1355 Asn Phe Arg Glu Cys Lys Tyr Ile Thr Asp Cys Asp Gln Ile Phe Glu
     1356              2565            2570            2575
     1358 Ser Leu Asn Met Lys Ala Ala Val Gly Ala Leu Tyr Ser Gly Lys Lys
     1359              2580            2585            2590
     1361 Lys Ala Tyr Phe Glu Asn Ser Thr Phe Asp Asp Arg Asn His Leu Leu
     1362         2595            2600            2605
     1364 Gln Leu Ser Cys Leu Arg Leu Phe Lys Gly Asp Leu Gly Ile Trp Asn
     1365      2610            2615            2620
     1367 (Gly) Ser Leu Lys Ala Glu Leu Arg Pro Ile Glu Lys Val Glu Ala Asn
E--> 1368 (625)              2630            2635               2640
     1370 Lys Thr Arg Thr Phe Thr Ala Ala Pro Ile Glu Thr Leu Leu Gly Gly
     1371              2645            2650            2655
     1373 Lys Val Cys Val Asp Asp Phe Asn Asn Gln Phe Tyr Asp Leu Asn Met
     1374              2660            2665            2670
     1376 Lys Cys Pro Trp Thr Val Gly Met Thr Lys Phe Tyr Cys Gly Trp Asn
     1377         2675            2680            2685
     1379 Asp Leu Leu Gly Lys Leu Pro Asp Gly Trp Ile Tyr Arg Asp Ala Asp
     1380      2690            2695            2700
     1382 (Gly) Ser Arg Phe Asp Ser Ser Leu Thr Pro Tyr Leu Leu Asn Ala Val
E--> 1383 (705)              2710            2715               2720
     1385 Leu Gly Ile Arg Glu Phe Phe Met Glu Asp Trp Asp Ile Gly Val Gln
     1386              2725            2730            2735
     1388 Met Leu Arg Asn Leu His Thr Glu Ile Ile Tyr Thr Pro Ile Ala Thr
     1389              2740            2745            2750
     1391 Pro Asp Gly Thr Val Val Lys Lys Phe Arg Gly Asn Asn Ser Gly Gln
     1392         2755            2760            2765
     1394 Pro Ser Thr Val Val Asp Asn Thr Leu Met Val Cys Ile Cys Val Gln
     1395      2770            2775            2780
     1397 (Tyr) Ser Leu Ile Met Asn Ser Val Lys Phe Glu Asn Gln Asp Asp Val
E--> 1398 (785)              2790            2795               2800
     1400 (Cys) Arg Tyr Phe Val Asn Gly Asp Asp Leu Leu Leu Ala Ile Asn Pro
     1401              2805            2810            2815
     1403 Lys Phe Ile His Ile Leu Asp Ser Phe Lys Val His Phe Ala Asn Leu
     1404              2820            2825            2830
     1406 Gly Leu Asp Tyr Asp Phe Ser His Arg Thr Lys Asp Lys Gly Glu Leu
     1407         2835            2840            2845
     1409 Trp Phe Met Ser His Lys Gly Val Lys Leu Asn Asp Met Tyr Ile Pro
     1410      2850            2855            2860
     1412 (Lys) Leu Glu Pro Glu Arg Val Val Ser Ile Leu Glu Trp Asp Arg Ser
E--> 1413 (865)              2870            2875               2880
     1415 Val Lys Pro Glu His Arg Leu Glu Ala Ile Cys Ala Ser Met Ile Glu
     1416              2885            2890            2895
     1418 Ala Trp Gly Tyr Pro Arg Leu Ile His Glu Ile Arg Lys Phe Tyr Ala
     1419              2900            2905            2910
     1421 Trp Val Leu Glu Gln Ala Pro Tyr Asn His Leu Ala Ser Glu Gly Lys
     1422         2915            2920            2925
     1424 Ala Pro Tyr Ile Ser Glu Thr Ala Leu Lys Arg Leu Tyr Thr Cys Glu
     1425      2930            2935            2940
```

See page 4

RAW SEQUENCE LISTING   DATE: 03/04/2002
PATENT APPLICATION: US/10/076,839   TIME: 14:56:13

Input Set : A:\PH-1176 (Sequence Listing).txt
Output Set: N:\CRF3\03042002\J076839.raw

```
        1427 Glu Gly Ser Ala Asp Glu Ile Met Ser Tyr Leu Glu Met Cys Ala Ser
E--> 1428 945             2950             2955             2960
        1430 Asp Leu Asn Glu Asp Glu Tyr Phe Asp Asp Glu Asp Val Ser His Gln
        1431             2965             2970             2975
        1433 Ser Ala Leu Asp Ala Gly Lys Pro Thr Ala Glu Asn Lys Lys Asp Asp
        1434             2980             2985             2990
        1436 Glu Glu Arg Lys Asn Lys Glu Glu Lys Gln Glu Asn Lys Asn Lys Asn
        1437         2995             3000             3005
        1439 Lys Glu Val Glu Lys Lys His Glu Lys Thr Ser Asn Ser Ala Ser Gly
        1440      3010             3015             3020
        1442 Ala Ile Val Ser Asn Asn Glu Lys Asp Lys Asp Val Asp Val Gly Ser
E--> 1443 025             3030             3035             3040
        1445 Ser Gly Ser Phe Ile Ile Pro Arg Ile Lys Ser Ile Ser Asn Lys Leu
        1446             3045             3050             3055
        1448 Thr Met Pro Lys Val Lys Gly Lys Gly Ile Leu Asn Leu Glu Phe Leu
        1449             3060             3065             3070
        1451 Leu Gln Tyr Thr Pro Asp Gln Val Asp Ile Ser Asn Thr Arg Ala Ser
        1452         3075             3080             3085
        1454 Ile Ser Gln Phe Asn Thr Trp Tyr Asn Ala Val Lys Glu Ser Tyr Gly
        1455      3090             3095             3100
        1457 Val Ser Asp Glu Glu Met Gly Ile Ile Leu Asn Gly Leu Met Val Trp
E--> 1458 105             3110             3115             3120
        1460 Cys Ile Glu Asn Gly Thr Ser Pro Asn Ile Asn Gly Met Trp Phe Met
        1461             3125             3130             3135
        1463 Met Gln Gly Glu Glu Gln Ile Glu Tyr Pro Leu Gln Pro Ile Val Glu
        1464         3140             3145             3150
        1466 Asn Ala Lys Pro Thr Leu Arg Gln Ile Met Ala His Phe Ser Asn Val
        1467         3155             3160             3165
        1469 Ala Glu Ala Tyr Ile Glu Lys Arg Asn Tyr Glu Lys Pro Tyr Met Pro
        1470      3170             3175             3180
        1472 Arg Tyr Gly Ile Gln Arg Asn Leu Thr Asp Met Ser Leu Ala Arg Tyr
E--> 1473 185             3190             3195             3200
        1475 Ala Phe Asp Phe Tyr Glu Met Thr Ser Arg Thr Pro Ala Arg Ala Arg
        1476             3205             3210             3215
        1478 Glu Ala His Ile Gln Met Lys Ala Ala Ala Leu Arg Asp Ala Asn Asn
        1479             3220             3225             3230
        1481 Lys Met Phe Gly Leu Asp Gly Lys Val Gly Asn Ala Thr Glu Asn Thr
        1482         3235             3240             3245
        1484 Glu Arg His Thr Ala Asp Asp Val Asn His Asn Thr His Ala Phe Thr
        1485     3250             3255             3260
        1487 Gly Val Arg Tyr Tyr
        1488 3265
        1563 <210> SEQ ID NO: 4
        1564 <211> LENGTH: 243
        1565 <212> TYPE: PRT
        1566 <213> ORGANISM: Papaya Leaf-Distortion Mosaic Virus
E--> 1568 <400> SEQUENCE: 2
        1569 Gly Ala Ser Ser Val Lys Gly Leu Arg Asp Tyr Asn Gly Val Ala Ser
        1570  1             5             10             15
```

see page 4

These numbers must match

```
1572 Ala Ile Cys Gln Leu Thr Asn Asn Ser Asn Gly Arg Ser Thr Thr Thr
1573              20                  25                  30
1575 Tyr Gly Val Gly Phe Gly Ser Tyr Ile Ile Val Asn Arg His Leu Phe
1576              35                  40                  45
1578 Lys Glu Asn Asn Gly Asn Leu Leu Ile Lys Ser Thr His Gly Asn Phe
1579      50                  55                  60
1581 Asn Ile Arg Asn Ser Lys Gln Ile Lys Val Val Gly Val Glu Asp Arg
1582 65                  70                  75                  80
1584 Asp Ile Ala Ile Leu Gln Met Pro Lys Asp Phe Pro Pro Phe Ala Gln
1585              85                  90                  95
1587 Arg Leu Arg Phe Arg Asn Pro Ile Val Gly Glu Ser Ile Cys Leu Val
1588             100                 105                 110
1590 Gly Asn Thr Phe Gln Glu Lys Tyr Asn Ala Ser Ile Val Ser Glu Thr
1591             115                 120                 125
1593 Ser Lys Thr Phe Pro Arg Val Glu Gly Ser Phe Trp Lys His Trp Ile
1594      130                 135                 140
1596 Asn Thr Thr Glu Gly His Cys Gly Leu Pro Leu Val Ser Val Thr Asp
1597 145                 150                 155                 160
1599 Gly Phe Ile Val Gly Ile His Ser Leu Met Ser His Lys Tyr Asp His
1600             165                 170                 175
1602 Asn Tyr Phe Ser Asn Phe Asp Asp Ala Phe Glu Gly Asp Tyr Ile Asn
1603             180                 185                 190
1605 Lys Leu Lys Glu Leu Lys Trp Glu Gln Asn Trp Thr Tyr Asn Val Asn
1606             195                 200                 205
1608 Thr Val Ser Trp Gly Asn Met Lys Leu Gln Asp Ser Ala Pro Cys Lys
1609      210                 215                 220
1611 Glu Phe Lys Thr Thr Lys Leu Ile Ser Asp Leu Cys Thr Glu Pro Val
1612 225                 230                 235                 240
1614 Cys Ala Gln
1617   1/1
```

[handwritten note:] remove extra material at end of file

VERIFICATION SUMMARY   DATE: 03/04/2002
PATENT APPLICATION: **US/10/076,839**   TIME: 14:56:14

Input Set : **A:\PH-1176 (Sequence Listing).txt**
Output Set: **N:\CRF3\03042002\J076839.raw**

L:9 M:270 C: Current Application Number differs, Replaced Current Application No
L:9 M:271 C: Current Filing Date differs, Replaced Current Filing Date
L:36 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:1
L:866 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:1
L:1068 M:332 E: (32) Invalid/Missing Amino Acid Numbering, SEQ ID:2
M:332 Repeated in SeqNo=2
L:1494 M:283 W: Missing Blank Line separator, <220> field identifier
L:1568 M:212 E: (34) Invalid or duplicate Sequence ID Number, SEQUENCE ID NOS:4 differs:2